THE MAC Flyer

OCTOBER 1986

Brad "Mac" Mackenzie learns a lesson ... Page 8

THE MAC Flyer

For Greater Safety in MAC Air Operations

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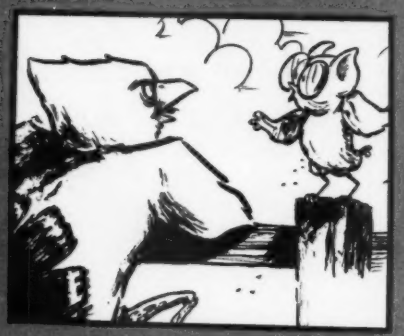

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The MAC Flyer is published by the Director of Safety, Military Airlift Command. The contents are informative and not regulatory or directive. Names of people and places in mishap stories are representative and not necessarily of the aircraft or equipment involved. Information in any article may not be construed as incriminating under Article 31, UCMJ.

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Fed Up?

So you say you're tired of listening to the ravings of *The MAC Flyer* staff writers. You're absolutely **sure** that anyone with a dull mind and a sharp crayon can write *at least* as well as those clowns. You suspect the *TMF* staff has lost what little hold they had on reality. You're looking for that personal touch in *your* flight safety magazine.

Well, **WE** (those clowns at *The MAC Flyer*) agree! So, to accommodate the desires of our stalwart readership, we are once again offering *YOU*—that's right, *YOU*—the opportunity to contribute directly to what you read in *TMF* by participating in the 1987 MAC Flight Safety Writing Contest.

Once again it's time for all you aviation enthusiasts to reach into the old memory banks and recount one of your flight safety related "war stories." Write it down and send it to us—prose or poetry, we don't care. Each entry will be carefully studied by our team of crack experts, who eventually designate the first, second, and third place winners, along with honorable mention and special category winners. Handsome desk sets or plaques (not to mention a *free* one-year subscription to *The MAC Flyer*) are the prizes, but the real thrill is seeing your story, picture, and name grace the pages of MAC's *most* prestigious flight safety magazine.

So don't delay. Start *your* story *now!* Remember, time and the 1987 MAC Flight Safety Writing Contest wait for no one.

THE RULES

The 1987 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished and postmarked no later than 31 March 1987. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message.* Manuscripts must be double-spaced, typed and submitted in two copies. Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. The cover sheet must contain a brief autobiography.

The contest is open to anyone. Entries qualifiying under the above rules earn their author a free one-year subscription to *The MAC Flyer.* However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a special category. All winning stories will be published in *The MAC Flyer.* Entries should be addressed to:

Flight Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB, IL 62225-5101

by Mr. James B. Zazas
Carthage, North Carolina

Rarely does the United States Air Force "break-into" one of its own offices. Capt. Arron Learne, an Air Force Institute of Technology graduate student studying human factors in flight safety, realized this fact. He also realized his intrusion was necessary

SPECIAL CATEGORY
1986 MAC FLIGHT SAFETY WRITING CONTEST

and unique. Thirty years of valuable mishap reports, housed in the long rows of standard-issue, grey filing cabinets at the Air Force safety office, needed to be data-recorded and preserved before they were damaged or destroyed. Air Force archives revealed most of these written records were lost in 1987 A.D. as a result of a freak lightning strike and ensuing fire.

Col. William "Will" Learne tossed uneasily in his bed. While his lean, six-foot body moved sheets and pillows aside, his mind wrestled with a nightmare. In terrifying clarity his mind repeated scenarios of sophisticated, multi-crew planes busting weather minimums and ramming into mountains; young, aggressive pilots exceeding an aircraft's capabilities, leading to structural failure; and old, experienced aviators stating with mock pride, "It can never happen to me." However, buried within Colonel Learne's tormented subconscious was another, more terrifying nightmare—that no one cared to learn from the mistakes of the past to live for the future.

While a strong wind outside signaled the start of a thunderstorm, Colonel Learne awoke in a cold sweat. The very familiar surroundings of his bedroom revealed his "visions of gloom and doom" were only nightmares.

Still trembling from his lifelike experiences, he wondered about the hidden meanings behind his nightmares. Was his job as Chief, Flight Safety and Mishap Trend Analysis Division, exerting too much pressure? Were the vast files of mishap reports at his office bringing forth "ghosts" to influence his actions towards flight safety? Colonel Learne decided he would go to his office to seek an answer now, even if it was 2 o'clock in the morning.

Will glanced at his peacefully sleeping wife while he dressed for the nasty weather outside. He was thankful she and his ten-year-old son, asleep in the next room, did not have to experience his nightmares or their consequences. But for countless airmen and countless airmen to be, Colonel Learne's nightmares were all too real.

Captain Learne set up his recorders carefully. He marveled at the equipment's ability to scan and record selected documents without having to actually open any of the slate colored cabinets. Captain Learne was amazed even more that his friends and superiors at Unified Defense Intelligence-Historical Division (UDIHD) allowed him to borrow the sophisticated equipment, much less grant his request to "penetrate" another Air Force office.

"Captain, be careful! We cannot afford to disturb anything, files, desks, chairs, not even a paper clip."

MSgt. Anthony Jackson, a short, slightly balding veteran with twenty-two years in service, understood well the risks at hand. He knew all intrusions required special care and that AFIT students were most apt to cause a mistake in their zeal to acquire accurate research documentation. Besides assisting these students with the fancy equipment, Sergeant Jackson was always nearby to insure the time line was not disrupted anytime a venture or "intrusion" into the past was required.

"Don't worry, Tony," Captain Learne commented. Glancing over at his immensely qualified partner he added, "By the way, how's the grid holding?"

Sergeant Jackson looked at a small, television-like box before him. A geometric design of multi-colored, concentric circles were presented on the illuminated screen.

"Looks good, sir. The temporal lock is holding very well. At least you haven't disturbed anything yet," Sergeant Jackson said wryly.

Captain Learne ignored the last remark. He had a lot of work to do and so little time to do it. The UDIHD folks had given him only 20 minutes to gather his research materials.

Nuts! thought Captain Learne. All these records had microfilmed copies in 1987, yet so very few are preserved today. I hope I can record enough files before I have to leave.

A pre-intrusion scan by UDIHD revealed a major temporal and electro-magnetic disturbance occuring towards the conclusion of Captain Learne's recording operation, yet oddly, this disturbance did not upset the time line. As far as the scanner operators were concerned, history was preserved. Therefore, they thought no outside scanning of the intrusion area was necessary.

AFIT and UDIHD personnel held a meeting before the intrusion to weigh the risks of Captain Learne's project. Many in

attendance were intrigued by Captain Learne's premise that certain types of aircraft mishaps could have been prevented had the aircrews become familiar with previous mishaps. Even more promising was Captain Learne's conviction that given the state-of-the-art in computer controlled aircraft, the day would come when the "pilot," the human monitor onboard, may have to effect manual control. Then he would have to rely on all his abilities and experiences to safely return the aircraft to earth. What better way to learn possible problems or hazards than to learn from the mistakes of others.

After a heated debate, a decision was rendered. The educational value of the two-hundred-year-old mishap reports was too important to be destroyed and forever lost. Therefore, an "intrusion" was approved. Only Captain Learne and the UDIHD's most experienced time gate operator, Sergeant Jackson, would go back to 1987 to record the data.

Colonel Learne braved the storm as he headed for his office. His mind was on his nightmares. I *must* find an answer, he thought to himself as he pulled up his coat collar to hold out the driving rain. I *will* find an answer.

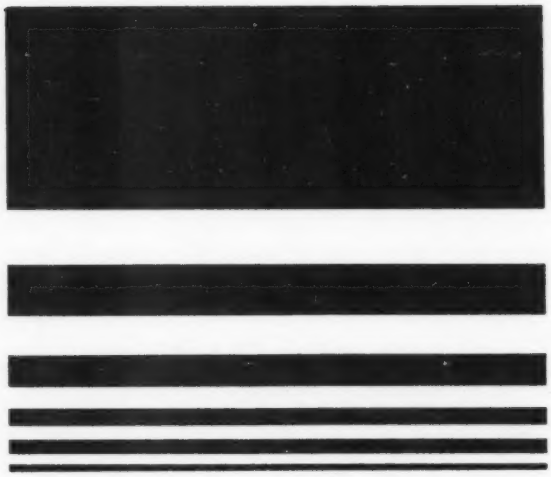
Sergeant Jackson looked at his grid screen in sudden disbelief. The once-uniformly circular lines were starting to flatten and warp.

"Captain Learne, we're getting a grid shift," Sergeant Jackson warned. "The temporal lock is slipping."

"It can't be!" Captain Learne was incredulous. "We have five minutes left before project completion and one more minute before total temporal interference. Unless, of course . . . ." Arron Learne's voice trailed to silence.

"Unless, of course," said Sergeant Jackson, picking up the train of thought, "the storm outside is upsetting the grid or this interference is caused by a previously unscanned human intrusion." Sergeant Jackson's voice sounded urgent now. "Quick, Captain, shutdown your recorders. I think our scanned event is about to occur. I'm setting the Gate for Open Passage in three minutes."

Colonel Learne walked into the large, cinder block building that housed his office.



"Captain, be careful! We cannot afford to disturb anything ..."

He felt better knowing familiar surroundings were only a few doors down the dark hallway. In a few more seconds, he would be in solitude. He realized he would be alone as a mortal, but he felt somewhat uneasy that he would be in the company of nameless "ghosts" from countless mishap reports.

"Captain Learne, the Gate is open. Total passage will take three minutes." Sergeant Jackson knew his job well. His 22 years in the Air Force as a time technician spoke highly of his abilities in this relatively new and very complex field. He knew there was no margin for error when one "intruded" the past.

"Sir, if you will, please hold on to your recorders. We don't want to leave any evidence of our visit."

Captain Learne complied. "Okay, Sergeant. Hey, I can see through myself. I'm always amazed by this time travel stuff." Captain Learne looked comically at his friend and added, "Tony, with your expertise on the gate, you could make me disappear like the Cheshire Cat in Alice in Wonderland. What a great Halloween stunt."

Sergeant Jackson never heard the last comment. His eyes and mind were focused on the trim, six-foot Colonel walking into the room.

To any rational man, the appearance of a couple of aberrations would make the heart beat faster. A rub of the eyes while inhaling deeply a few times usually clears any illusions from the mind. Colonel Learne rubbed his eyes and breathed deeply. The illusions remained, and even more startling, they talked.

"Colonel," Sergeant Jackson spoke first, his voice strangely calm, especially in light of the events now unfolding, "do not be frightened. We are only visitors and we will be leaving shortly."

Colonel Learne was transfixed. He wanted to do something more than stand there with his mouth open and his body frozen in fear. His mind raced for answers while the two human forms before him slowly disappeared. All he could muster was a weak whisper, "Who are you?"

"Sir, I cannot go into detail about who we are or what we are doing. But please believe me when I say the information contained in your files is of great interest to us."

Colonel Learne summoned more courage to speak again. "Why are these files so important? They are only mishap reports. What value are they to you?"

While Sergeant Jackson signaled a one-minute-warning Captain Learne pondered an answer. Very shortly, a fitting reply came to mind.

"Colonel, so many times in flight history, a mishap occurs which is similar to one that occurred before. The names are different, yet the circumstances are all too familiar. Aircraft are broken and human lives are lost in similar scenarios. I firmly believe if more crewmembers were cognizant of the causes of certain previous mishaps, they may not be involved in a mishap with similar causes, and possibly, similar results."

Colonel Learne knew it; the ghosts of these files had sent representatives to influence him. They came with messages from the dead to pass on to the living.

Sergeant Jackson indicated a twenty-second warning. Captain Learne realized he had time enough for one more comment before total passage.

"Colonel, your position no doubt requires you to 'get the word out.' Please pass to aircrews the importance of studying the mistakes of others. Flight safety should be a conscious attitude, a mindset that yearns for ways to be safer in ground and flight operations. Please let them know their future could very well be the past of others that hasn't yet been discovered."

Colonel Learne wanted to respond. His mind was flooding with so many questions. Before he could speak, however, there was a blinding flash followed by an almost deafening explosion. "Will" Learne fought to maintain consciousness as he crawled out of his fire-engulfed office. A bolt of lightning had passed through a window and struck the long row of slate colored files just as Captain Learne and Sergeant Jackson completed total passage.

"Captain Learne," said Sergeant Jackson as he extended his right hand in gratitude. "Thank you."

Captain Learne responded in kind, grasping Sergeant Jackson's hand in a firm shake. "Of course. But what for?"

Sergeant Anthony Jackson looked carefully at his young superior. He knew this lad had a proud lineage behind him and an equally proud future ahead. As a Time Technician sworn to secrecy, Sergeant Jackson knew he could not divulge all the information he knew about the intrusion results or the pre-intrusion scan. However, in light of the events that had just occurred, he thought a few, carefully chosen hints were appropriate to describe the success of the operation.

"Thank you, Captain Arron Learne," said Sergeant Jackson. With a smile and a wink, he added, "Your message to your great-great-great-great-great grandfather did not upset the time line as we have it recorded, but I know it did save the lives of many aircrews' future past."

Mr. Zazas was commissioned in the Air Force after graduating from DePaw University in 1977 with a Bachelors Degree in Political Science. He completed UPT at Columbus AFB, Mississippi, and went on to fly C-130s at Pope AFB, North Carolina. Mr. Zazas is presently a Flight Officer with Piedmont Airlines in Greensboro, North Carolina.

"Mac" MacKenzie discovers what happens when crewmembers lose ...

Situational Awareness

Brad "Mac" MacKenzie's sunburned skin itched beneath his NOMEX flight suit. However, his sunburn was the *only* uncomfortable aftereffect of what otherwise turned out to be the "perfect" late-summer vacation. The sun-drenched beaches of those Caribbean islands which, a few days before, provided the idyllic vacation setting for he and his wife, were now only pleasant memories. It was time to get back to work. A two-week safety SAV was just the thing he needed to get his mind back to business.

This TDY would prove interesting because Mac would not only have the opportunity to "beef up" a couple of sagging safety programs, but also begin the training of the newest addition to the Numbered Air Force's flight safety office—Capt. Laura Langford, a recent arrival. She had served as a C-141 squadron instructor pilot and, subsequently, as a wing flight safety officer at her last base. Her previous flight experience included flying MAC CT-39s and a variety of single and twin-engine civilian airplanes. Laura was a sharp officer and Mac knew it. Her "training" would basically consist of learning the ropes of the NAF along with introductions to appropriate squadron and wing commanders and their safety staffs.

"Mac, are you ready to attend the crew briefing or are you going to sit and daydream all day?" grinned Captain Langford.

"Be right with you," Mac responded as he and Laura began making their way to the briefing room. "You know, we're lucky to get this airlift, Laura, and this trip will give you the opportunity to get a quick glimpse of how the C-130 guys handle a mission."

"As a matter of fact, Mac, this will be my first flight on a C-130 since ROTC summer camp. I'm looking forward to it," replied Laura.

The crew briefing was routine—maybe too much so—and within the hour the crew assembled at the aircraft. Capt. Tom Collier, the C-130 aircraft commander, seemed distraught as he walked around the aircraft performing his "last chance" inspection. This mission had been a difficult one for the crew of the Hercules. What started out as a three-day mission had extended into a week-long ordeal. This was the last leg of the mission and, though he didn't relish the idea, the thought of deadheading a couple of higher headquarters types didn't really upset him. The only thought in Captain Collier's mind was getting home. Besides, this final mission leg would be routine air/land. The weather at destination was IFR only, but good enough to fly any one of three available instrument approaches. Tom was sure this flight would be a piece of cake.

After arriving at the aircraft (call sign Spook 33), Mac and Laura handed their bags to one of the two loadmasters on the crew and then each strapped into one of the available troop seats.

"Mac, what did you think about the crew briefing we just sat through?" questioned Laura.

"Well," replied Mac, "to be perfectly honest, I've sat in on better ones. Frankly, I got the feeling the crew—and especially the AC—was just going through the motions. Nobody looked particularly interested and Captain Collier did little to generate any enthusiasm. What about you, what did you think?"

"I got pretty much the same impression.

I've no doubt that Tom is an able pilot, but in this case, I think he's *assuming* nothing will go wrong on this sortie. Keeping the feeling that something can go wrong at any time usually gives you the edge to handle it."

"Assuming nothing will go wrong is an easy trap to fall into, Laura, especially when you're on the road as much as these guys are," replied Mac. "After level-off do you want to go up front for a while and observe?"

"You bet. That is if you don't mind staying back here."

"That's all right Laura, I've already spent my share of time in the cockpit of a '130. No thanks, I think I'll just stretch out and go over some of the notes I've made for my briefing at the flight safety meeting tomorrow. I've been asked to address the necessity for situational awareness during all flight phases. Think I'll use the NTSB report on the L-1011 crash in Florida as an example of poor situational awareness."

After level-off, Laura disappeared up the steps leading to the cockpit. Mac opened his briefcase and removed his briefing notes, along with a copy of the L-1011 mishap report. As Mac began poring over the pages of the report, the normal, incessant, low-frequency vibrations of the Hercules' engines combined to create a hypnotic effect. Mac closed his eyes and the hum of Spook 33 soon ushered him into an uneasy slumber.

Mac's eyelids popped open as he felt the jolt of someone shaking his shoulder. His eyes watered as the inky blackness of thick, black smoke invaded them. The apparition shaking Mac's shoulder turned out to be one of the loadmasters wearing a smoke mask. Mac's lungs burned as he coughed up his first full breath of smoke. The loadmaster quickly assisted Mac in donning a mask. The second loadmaster was busy extinguishing the fire in the wire bundle which created the smoke. In a few minutes the air began to clear. Mac signaled his intentions to go forward to the senior loadmaster, then moved to the ladder and climbed the steps to the cockpit.

The cockpit crew was on oxygen and everything appeared under control. Laura looked at Mac and simply shook her head. Mac could tell things hadn't gone well.

"Captain MacKenzie, we just experienced a small cabin fire, which is now under control," informed Captain Collier. "We're procedure turn outbound for the ILS Runway 22, full stop. Everything seems normal now and we should be on the ground shortly."

"Have you declared an emergency?" queried Mac.

"No. We extinguished the fire and there

doesn't seem to be any other problem. However, I did inform ATC of our minimum fuel condition. The unforecast headwinds really took a chunk out of our fuel reserve. We should be able to make it, however. No sweat."

Mac couldn't believe what he'd heard. He didn't understand why Tom hadn't declared an emergency and for the life of him couldn't grasp the reason they were wasting time flying the *procedure turn*.

"Did approach lose radar contact with us?" Mac intoned.

"No," replied the AC. "This is normal sequencing."

Mac was visibly irritated by this time. Captain Collier had obviously failed to grasp the seriousness of the situation. Plus, how could Laura have just sat there and not said anything? Just as Mac was about to make a very emphatic suggestion that Captain Collier declare an emergency, ATC directed a turn inbound followed by clearance for the ILS approach.

No sense in pressing the issue now, Mac reasoned. Things look good. We'll talk about this one on the ground.

The aircraft continued inbound and began descent at the FAF—five miles out, departing 3,000 feet for 850. Suddenly circuit breakers started popping and, once again, the crew began to smell the now all-to-familiar fumes they'd smelled earlier. This was followed shortly by a panicked call from the loadmasters alerting Captain Collier to the fire that was once again burning in the cargo compartment.

At once the AC was busy calling for checklists and attempting to isolate the source of what he was sure was an electrical problem. He was *so* busy that he barely heard the controller alert him to the fact the localizer had just gone into alarm and was now unreliable for course guidance.

"Spook 33, do you have the field in sight?" queried the controller . . . . Spook 33, how do you hear?"

"Spook 33 has you loud and clear. Field is *not* in sight," responded Captain Collier.

"Roger, Spook 33, climb straight ahead. Maintain 3,000 feet. This will be a vector for VOR runw . . ."

"Negative, approach, Spook 33 has an emergency—fire in the cargo compartment and we're low on fuel. We're transitioning to the TACAN Runway 22 approach," said the AC as he cut off the controller.

"Roger, Spook 33, cleared for the TACAN Runway 22 approach. I'll call the fire trucks.

Everything seemed to move in slow motion as Mac watched this grisly scene unfold. Tom was double-checking the TACAN frequency while his copilot fumbled wildly for the correct page of the approach plate book. The engineer was still looking for the source of the fire. Everyone was doing something, but no one, except Mac, saw the heading indicator 30° off course to the left and the VVI showing a 2,000 FPM descent. Before Mac could utter a warning, they were in VMC. But instead of looking at 7,000 feet of runway centerline, they were looking at a B-52, head on! Mac's life passed before him. Situational awareness: if only the AC had been more prepared for the unexpected; if only Tom had *not* taken the first fire so lightly and not gotten wrapped around the axle during the second; if only the crew had been prepared to *execute* the backup approach they'd given lip service to during the briefing, if only . . . if only . . . . The last thing that Mac heard before Spook 33 slammed into the right wing of the B-52 was an interphone call from the loadmaster telling Captain Collier that the cabin fire was extinguished—no sweat . . . .

Mac bolted upright as the loadmaster lightly shook his shoulder.

"Sorry to wake you, sir. We'll be landing in a few minutes."

Mac's eyes were wide open and his flightsuit was soaked with perspiration. Regaining his bearings he saw Captain Laura Langford sitting opposite him, casually looking out the window as the '130 touched down.

"You okay, MacKenzie?" questioned Laura when she looked over at Mac. "You look like death itself. Maybe you should see the flight surgeon."

"No, I'm really okay, Laura," replied Mac, attempting to regain his composure. "But I do have a few thousand words to add to my situational awareness briefing. Instead of using the L-1011 example, maybe I'll use a *fictitious* account of a C-130 that suddenly has an internal fire while IMC; low fuel, you know . . . ."

Mishap With A Moral

An Elementary Accident

Do you help or hinder the system?

The air traffic control system that comprises our operating environment is made up of a number of elements. When taken alone, they are relatively simple and manageable. When combined, all the elements of flying and controlling aircraft should form a smoothly run system. The people who function in this environment, the pilots and air traffic controllers, have a responsibility to themselves and each other to ensure the system operates as planned. Minor errors in how one element is managed will not, usually, adversely affect the system. But, when one error is compounded with another, catastrophe may be inevitable.

Errors in operating and controlling aircraft resulted in such a catastrophe at 0847 EDT on 23 Sep 1981, when a Ronson Aviation Bell 206B helicopter and a Seminole Air Charter Piper Seneca II airplane collided in mid-air. The pilots and the tower controller failed to effectively manage their respective elements of the system, leaving two people dead and two injured.

A Piper PA-34-200T Seneca II, N8110R, departed Syracuse, New York, about 0720 EDT on an instrument flight plan. At 0821, N8110R began receiving radar vectors and descent instructions from successive air traffic control (ATC) facilities along its route. At approximately 0843:09, the airplane was cleared by Newark Approach Control to turn left to a heading of 090° to intercept the Runway 06 localizer at Teterboro airport. About 26 seconds later N8110R was cleared by Newark Approach Control for an ILS approach to Runway 06 from its position three miles from the DANDY intersection. DANDY intersection is the final approach fix for the ILS approach to Runway 06 and is 2.2 nm outside the outer marker for this approach. At 0845:04, N8110R received the following instructions: "8110R, you're at DANDY, radar service terminated, call Teterboro tower nineteen five, good day (sic)." N8110R acknowledged the transmission.

N8110R called Teterboro tower at 0845:22. The tower acknowledged this transmission and requested the flight report over the outer marker for a left base leg for Runway 01. At 0847:08, the pilot of N8110R reported, "inside the marker, left base for 01." The tower replied, "in sight, continue, traffic departing." The pilot of N8110R stated he did not report over the outer marker because of congestion on the radio frequency. According to the passenger, the pilot did not have the marker beacon turned on until the controller requested he "report the outer marker."

The pilot and passenger said they were scanning the area forward and to the right of their flight path for inbound traffic. The passenger, a private pilot who had received training toward an instrument rating, stated he was leaning forward in his seat, looking for traffic ahead and to the right, particularly looking for aircraft inbound from the southeast.

The helicopter, a Bell 206B, N27670, departed Woodbridge, New Jersey, about 0829 on a course of 040°, a direct course to the Teterboro airport. At 0830, the flight was told by the Newark, New Jersey, tower controller to maintain 1,300 feet while crossing the Newark Terminal Control Area (TCA). N27670 was cleared to descend to 900 feet, leaving the TCA at 0837. Newark maintained radar contact until the helicopter reached an altitude of about 700 feet, still on a course of 040°. The pilot of N27670 contacted the Teterboro tower at 0844:57 and was told to "stand by." The next contact was at 0846:27 when N27670 reported "coming up on the sports complex . . . ." The tower controller answered this with a request for a report ". . . about a mile south, I don't have you in sight." The controller stated he considers the phrase "coming up on" to mean

about one fourth mile from a point when used by helicopter pilots.

N8110R and N27670 collided at 0847:34 over the Meadowlands Sports Complex. The helicopter fell into the sports complex parking lot. Both crewmembers aboard were killed. The airplane, missing about 8 feet of its left wing and its right engine, made a gear-up landing in a marsh about seven-tenths of a mile east of the collision point. The pilot was seriously injured and the passenger received minor injuries.

Witnesses said the two aircraft converged at an angle of nearly 90°, with the helicopter approaching from the right of the airplane. Several witnesses said the helicopter appeared to bank right immediately before the collision. Both persons in the airplane said they never saw the helicopter before the collision.

Analysis

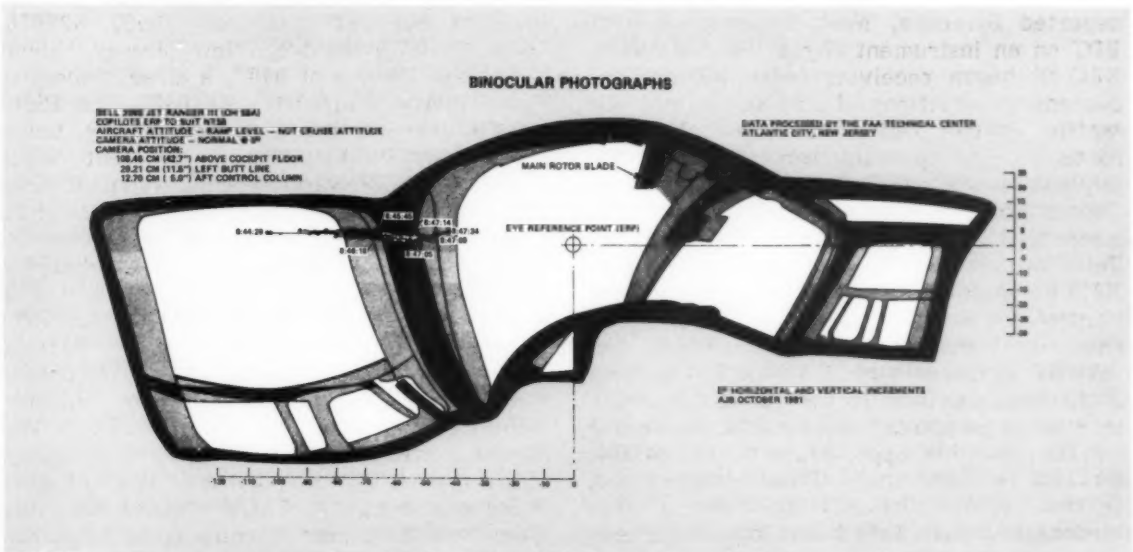
The NTSB found the flightcrews and the air traffic controller properly certificated and qualified. Both aircraft were within prescribed weight and balance limitations.

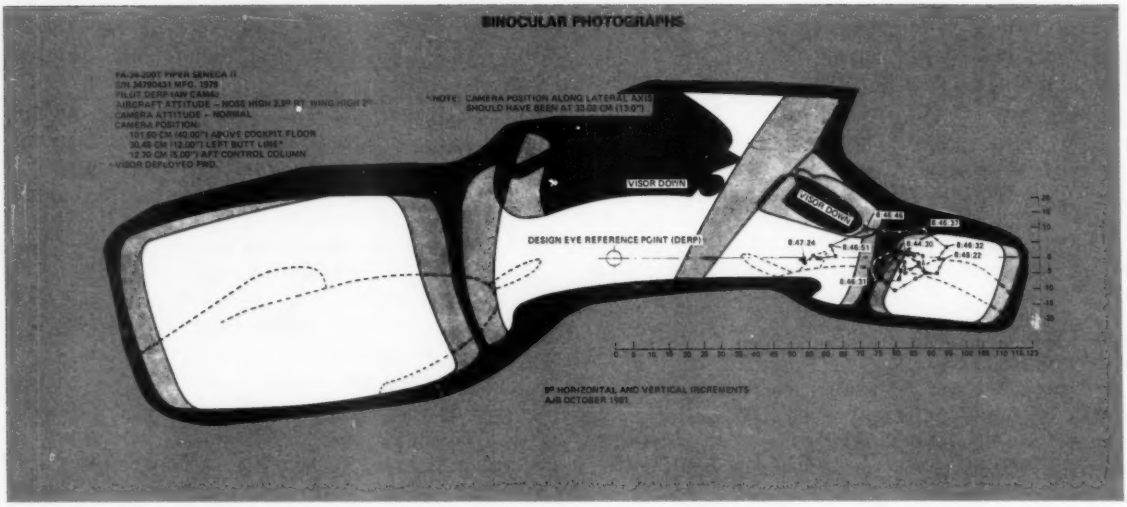
At the time of the collision, the weather was generally clear. The Teterboro weather was: scattered clouds at 7,000 feet, visibility 25 miles, temperature 53°F, wind 320° at 9 knots, altimeter 29.95 inches.

There are several published instrument approaches to the Teterboro airport, including an ILS to Runway 06. When visibility permits, and the winds favor use of Runway 01, aircraft making an ILS approach to Runway 06 may be directed to turn right from the ILS course onto a left base leg for landing on Runway 01.

The Teterboro ATC tower is a visual flight rules (VFR) tower with a BRITE radar connected to the Newark approach control radar. Although the BRITE radar had been installed in the tower for a year and a half, no effort had been made to certify the controller at Teterboro to use it as an aid in controlling traffic. It was available and was turned on. The controller, however, stated he was not using it.

During examination of the communication transcripts, the Board found that at 0843:55, the Teterboro local controller received a telephone call concerning an administrative matter, which lasted until 0845:44. (The tower chief was in the local controller position.) During those two minutes there were eight separate transmissions by five different aircraft, among them the initial contacts by the accident aircraft. Five were not acknowledged by the controller, including that from Piper N8110R. Neither accident aircraft stated their position in the initial contact. The controller acknowledged the call from N27670 by saying "helicopter stand by" at 0845:01. He responded to only two other transmissions during the telephone conversation. N8110R's initial call was not acknowledged at 0845:22. After the





controller terminated the telephone conversation at 0845:44, the frequency became congested for about 90 seconds with transmissions and acknowledgments that were missed during the conversation. The board concluded the subject matter of the telephone call was not urgent and should have been put off until a time when traffic was light or until the controller was relieved at the position by other qualified personnel. The Board also concluded that if the controller had been certified to use the BRITE display and had used it to rapidly update himself on the traffic situation following the distraction of the telephone call, he might have perceived the developing conflict and issued an appropriate advisory.

Failures in the ATC element of the system weren't the only factor in this accident. It appeared the controller was catching up with a situation that had gotten ahead of him because of the telephone call. However, if the pilot of N8110R had turned on his marker beacon receiver when he began the ILS approach, which is normal procedure, he could have reported his position at the marker when the controller made the request. In the absence of a report at or near the outer marker, the controller no doubt believed the airplane was farther out on the ILS than was actually the case. When the pilot of a Lance, N1919H, reported his position as "8 miles out" southwest of the airport, the controller advised that he remain "well clear" of the ILS course because of traffic inbound on the ILS. Although at that time N8110R had already passed the outer marker, the fact that he issued this advisory showed the controller believed N8110R had not yet reached the marker.

When the helicopter reported "coming up on the sports complex," which is about three miles south of the tower and two miles south of the runway threshold, the controller believed that the helicopter was nearer the airport than the airplane and would cross the base leg for Runway 01 well ahead of the airplane. The phrase "coming up on" is sufficiently vague that it can be interpreted to mean anything. The phrase meant one thing to the helicopter pilot while it meant something much different to the controller. In addition to this factor, when the helicopter reported its position, it was about 1.6 miles south of the stadium, or about 3.6 miles south of the approach end of Runway 01 and nearly 5 miles from the control tower at an altitude of about 700 feet. Considering the relatively small profile presented by the helicopter viewed head-on at 5 miles, and the alternating light and shaded areas due to the scattered clouds despite the reported 25 to 30 miles visibility, it's probable the controller would not have made visual contact at that distance even with a concentrated visual search.

Therefore, considering the relatively vague position report from the helicopter, the absence of a timely report from the airplane, and the earlier distraction of the controller

by an administrative chore, the Board concluded the controller had an erroneous perception of the relative positions of the two aircraft and therefore did not consider them to be in potential conflict.

Looking beyond the human factors in this accident, there remains one more element of the system to consider: the aircraft and how they contributed to the accident.

From a study of binocular photographs oriented from the pilot's and copilot's seat eye reference point of the helicopter, it was apparent that the airplane would have been more visible to the pilot in the right seat than to the copilot in the left. However, the pilot would have had to look nearly 90° to his left to observe the airplane. The airplane probably would not have been large enough or have had sufficient relative motion to be apparent in his peripheral vision until just before collision. It's also possible that his scan for traffic was limited to the front and right of his flight path, and that he relied on the copilot to clear the flight path to the left. If the copilot's eyes were at the eye reference point, his view of the target would have been impeded. For the two minutes before the airplane's right turn away from the ILS, it was between 70° and 80° to the left of the helicopter's flight path and more than 1.5 miles away. It is unlikely the scan of either pilot in the helicopter included that area, or if they did include it, that they gave it as much emphasis as the areas more directly in their flight path.

The binocular photographs of the airplane indicate that, from the pilot's eye reference point, a large portion of the binocular vision area of the right cabin window is obstructed by the right wing and nacelle. While inbound on the ILS, the helicopter was hidden behind the right-front windshield post or the nacelle and wing. Flying the ILS would have directed most of the pilot's attention away from scanning in that area. During the turn to the base leg, the helicopter would have appeared briefly in the upper area of the right forward cabin window and then moved forward out of sight behind the right windshield post.

When the airplane was established on the base leg, the helicopter, relative to the right-seat eye reference point, would have continued to move forward and downward into the monocular vision area of the right windshield post and continued to increase in apparent size. It would have been in the binocular area for about 40 seconds and in the monocular area about the last 15 seconds before the collision. If the right-seat occupant were leaning forward and scanning to the southeast, his emphasis would have been directed away from the helicopter's actual position. In addition, if the passenger's eyes were positioned forward of the eye reference point, the target most likely would have been hidden by the windshield post. (Editor's Note: For more on the shortcomings of the human eye see The Limits of Sight in the June 1986 *TMF*.)

Probable Cause

The National Transportation Safety Board determined the probable cause of this accident was the failure of each flightcrew to see and avoid the other aircraft and the failure of the local controller to perceive the traffic conflict due to the controller's preoccupation with a nonessential administrative telephone call. Contributing to the accident was a delayed position report from the airplane pilot due to his failure to activate his marker beacon receiver and to controller-induced congestion on the radio frequency and an inaccurate position report from the helicopter pilot. The failure of the Federal Aviation Administration to train and qualify tower personnel in the use of the BRITE radar display was also a factor.

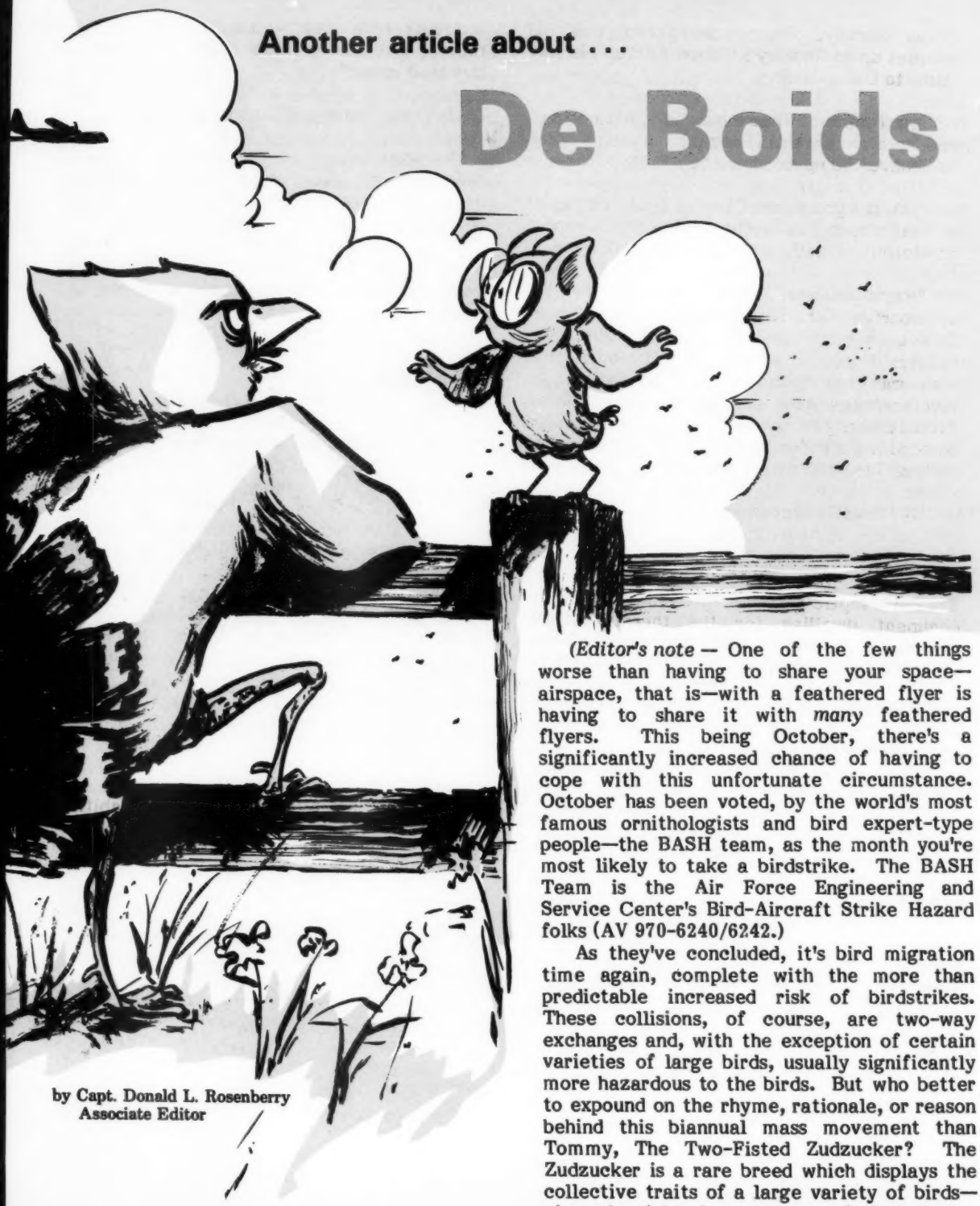
Application to MAC

Synergy is a 50-cent word taken from the Greek word synergos which means *working together*. This accident clearly represents what happens when people don't fulfill their responsibilities to make a system run smoothly. In this case, each person involved could have helped the other do his job better. The controller (in many accidents you could substitute pilot for controller) let a minor matter distract him from the more important task at hand. Both pilots misled the controller as to their true position. The FAA failed to provide training on a valuable aid that might have prevented the accident. Project yourself into this scenario. Are all *your* NAVAIDs set correctly on each approach? Do *you* let minor matters distract you? Are all *your* position reports accurate? *Do you help or hinder the system?*

Adapted from NTSB/AAR-82-6

Another article about . . .

De Boids



by Capt. Donald L. Rosenberry
Associate Editor

(Editor's note — One of the few things worse than having to share your space—airspace, that is—with a feathered flyer is having to share it with *many* feathered flyers. This being October, there's a significantly increased chance of having to cope with this unfortunate circumstance. October has been voted, by the world's most famous ornithologists and bird expert-type people—the BASH team, as the month you're most likely to take a birdstrike. The BASH Team is the Air Force Engineering and Service Center's Bird-Aircraft Strike Hazard folks (AV 970-6240/6242.)

As they've concluded, it's bird migration time again, complete with the more than predictable increased risk of birdstrikes. These collisions, of course, are two-way exchanges and, with the exception of certain varieties of large birds, usually significantly more hazardous to the birds. But who better to expound on the rhyme, rationale, or reason behind this biannual mass movement than Tommy, The Two-Fisted Zudzucker? The Zudzucker is a rare breed which displays the collective traits of a large variety of birds—given the right circumstances. So let's listen

in as Barney, The Brown-Eared Bul Bul catches up to Tommy at Yore AFB on his way south to Barbados.)

"Hi Tommy! What a pleasure it is to meet you here at Yore AFB again! I didn't think we'd have the opportunity to . . . "

"Oh, it's you again Cleaver Lips. I'd hoped to read about you in the government's report on victims of toxic waste, but no luck I see."

"Right you are, Tommy. As you know, I'm a reporter for *living down*, the Goose-founded aviation magazine for the 80s. Our readers have somehow developed a measurable liking for items featuring you, as incomprehensible as that may seem. Predictably, our upper management decided to send me out for one of my typically hard-hitting, in-depth interviews."

"Still haven't hired anyone literate 'ey?"

"My first question, Tommy, is direct. Why would you leave the comfort of your natural septic-reservoir-proximal multiple occupant dwelling for the thermal stress inducing pre-glass granules and lunar affected surface disturbances of the south?"

"You know, you could be personally responsible for science abandoning any research in the 'artificial intelligence' field. My guess is you've asked why I'd leave my lakefront condo for the sun and surf. Well the answer is simple, as are most avian needs—you can't tan yer tail feathers up north in the winter. Besides, I've a personal preference for weather which encourages the ladies' propensity to maximum surface area exposure, easy on the eyes, you know."

"Oh, so you have some health concerns with your vision. Our condolences. Since you have elected to relocate, could I trouble you for some explanation as to your selection of mid-migratory respite, especially as it impinges upon those human operated creatures which indiscriminantely feed on the putrified remains of buried animal and plant life?"

"Bul Bul, huh? Not very subtle, but appropriate. Look, I'm overdue at that new watering hole—The Vulture's Nest. I hear they've got the coldest Toenail Curlers on this land mass."

"Great, Tommy. I'll meet you there!"

"What a crowd, eh Meatface? I love it! Now about your typically impertinent, irrelevant question, there are a number of reasons why I and my flock would pick Yore AFB. But we're pretty picky, we simply won't do R & R just anywhere, and this mid-road-trip-rest also serves as a site survey."

"A sight survey? Oh I see, something akin to optimizing optical accuracy by inhabiting areas with manipulative refractive indices?"

"I'm talking about the annual Strut-N-Crow competition, Airhead. If you want a well-organized event, you've got to be choosy. Every season those HB (Human Being—ed.) curators alter some facet of the environment. I'm quite sure they're *trying* to get it right, after all, they've got those severely unsociable stilted metallic birds to keep happy, too. But, frankly, they're not very good at it."

"It's Barney, not Frank, and how do you mean not good?"

"Since you're fairly thick, I'll try to be explicit . . ."

"Careful Tommy. We won't be able to reach many readers if we can't be sold in 'The Early Bird' stores."

"Pull yourself together, bird! I'm going to explain the criteria we used to select Yore AFB for pre-game nesting."

"Sorry. You can't be too careful. They canceled *The Chick Clique* just because they did a feature on Debby the Deep Diving Darling."

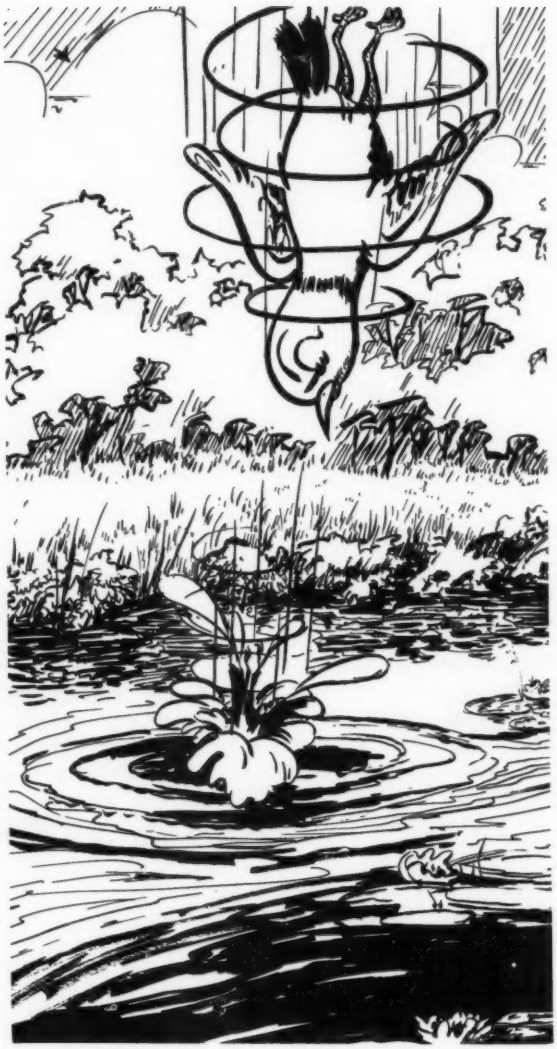
"You're kidding. Why cancel a fine mag just because of a feature story on a Starling?"

"Because the scientific name for Starling is Sturnus Vulgaris."

"Oh, I see. Well, anyway, we are looking for some very specific items, and we've got to be careful. Those HBs seem to have a way of ruining each and every positive factor. It's getting harder and harder to find an ideal spot, so we end up picking someplace with the greatest number of need solutions."

"Could you itemize those for the benefit of my readers?"

"I find it hard to believe anyone interested in what you have to say can actually read, much less do their own taxes, but here goes. First and foremost, you *got* to have water."



"Ah, the primordial chemical medium. Without it, our food supply would be shut down. Why, the sheer variety of food sources—insects of every genera, amphibians, and fishes—makes it an obvious necessity. It makes me drool just thinking about it."

"You drool all the time anyway, but food is the last reason we need water. This year's competition will include aqua-twirl and time diving events. It's very important to have a neat and tidy observation area. No spectator event is worth its salt if you have the draw but inadequate facilities. Those HBs have the most irritating habit of taking perfectly mahvelous pools of water, identifying them at their finest, then plowing them over during the dry season. I mean actually filling them in altogether. It's enough to make you give up caviar."

"Why that's . . . that's unavian! Why on earth would they tarnish a fine body of standing water? There's just no logic to it at all."

"Careful, you're about to implode, Vacuum Skull. There's more. They also have the nerve to eliminate all the clumps of brush and shrubs often carefully guarded by we fowl fellows. You take all that time to preserve the best and . . . ."

"Edge effects, of course. Those areas where the vegetation changes from forest to brush to grass etc, my favorites. Why, those are the single best areas for small mammal hunting. You can take your time tracking down a juicy rabbit, without fear of some larger predator dining on you. Provides cover for mice, and you—most convenient."

"You actually make me ill at times. Your habit of dining on small, unprepared, *Living* creatures, without so much as removing their unpleasant partially digested meals is *revolting!* Why can't you catch up to the rest of the world? Haven't you ever heard of reddened blackfish? It's the latest craze, even more popular than sushi, and you remember how universal raw fish became. That one even spread to the HBs!"

"Speaking of **them** again, do they ever do things which seem, well, actively mean or intentionally unpleasant?"

"Yes, I'm afraid they do. There's one particular breed which seems bent on disturbing our peaceful tranquility. These fellows do all sorts of things, from the macabre to the ridiculous in their attempts to irritate and intimidate us."

"Such as?"

"Well, take this technique of using small rectangular devices which do very realistic vocal imitations of us birds. They actually try to scare us with them."

"Ah, bioacoustics I think they call that. A technique of broadcasting recorded bird distress calls to alarm the flock. Does it work?"

"They are terrifying! They got one of them we can identify. It's a one hour recording of Clem after he first read his 50,000-worm investment in Artificial Falcon Husbandry was useless—it was a scam. One of the most dreadful things you'd ever want to hear!"

"Well, at least they don't do anything overtly harmful."

"Wrong again, Trash Breath. Go talk to Milford, the Many Feathered Muck Muck. Right after Mil swept the 'Best of Show' last year, he walked back to his roost to rest. He suddenly caught a very foul wind, which made him sneeze. Right in mid-sneeze, the HBs fired off one of those pyro tekneeks."

"Frightened him, did it?"

"Took me and Charley the Chunk Winged Curl Caller 45 minutes to pry the handkerchief out of his nose!"

"I gather then you aren't taking a live and let live attitude towards these HBs."

"For the first time in your life, you're not absolutely wrong, Nodule Nose. And they aren't, either. Listen to this excerpt from their printed propaganda. It concerns the funeral arrangements for deceased majestic aviators. 'When the whole carcass is present, an individual can pick out identifying features such as the beak, feet, and plummage. However, birds struck on low-level routes usually don't have enough large parts intact for easy identification. In these cases, some feathers or pieces of feather can be put into a ziplock bag and sent to the BASH Team.'"

"Wretch!"

"Don't read your notes while I'm talking! There's even more. These gruesome BASH Team folks want our friends and relatives in plastic bags, just to help evaluate future research needs in control and avoidance! Well, let me say this about that. If there are any HBs listening out there, pay attention. We've got thousands upon thousands of new right wing zealots in training. The next time you fly in **my** airspace you better be careful. These brave young lasses and lads know when to hit you and where. So when you least expect it, you'll lose that engine, or windshield, or whatever target they prefer. And while you sit back smugly counting the toll in birds, just remember this—we've a lot more airframes than you have, and our cause is just!"

"There you have it folks, Tommy the Two Fisted Zudzucker and his war on HB aviation. You read it here first!"

Microbursts

"The devil you say."

by Capt. Mike McLane
Randolph AFB, Texas

On 2 August 1985 at Dallas/Ft Worth International Airport, a Delta Airlines L-1011 encountered a disastrous wind shear. Authorities speculated that an isolated downdraft, too confined to be detected by the widely dispersed wind shear sensors, caused the aircraft to suddenly lose airspeed and altitude as it approached Runway 17L for landing. The aircraft experienced a wind shift from a 27-knot headwind to a 40-knot tailwind in approximately 20 seconds. This was more than either the pilot or aircraft could handle; recovery was not possible. The crash occurred a few seconds later, killing 132 persons on board and one motorist on the ground.

This was the third major airline accident in just over ten years attributed to what are now widely known as "microbursts." The other two occurred at John F. Kennedy International Airport in 1975 and New Orleans International Airport in 1982. Together, these three accidents resulted in almost 400 casualties. Microburst . . . "The Devil You Say!"

What is Wind Shear?

Wind shear is a sudden change in wind direction and/or speed over a short distance in the atmosphere. These changes can occur in both the horizontal and vertical planes. Wind shears are most often caused by low level jets, wind funneling, land-sea breezes, fronts, and thunderstorms. Most aircrews will, at one time or another, encounter wind shear in either the departure or arrival phases of flight. The result is usually only minor fluctuations in airspeed and altitude which can be easily corrected by the pilot. However, in some situations, the atmosphere is capable of producing severe wind shears that result in wind direction changes of up to 180° and wind speed changes in excess of 60 knots. A wind shear of this intensity can be treacherous should an aircraft unexpectedly fly into it at low altitude and low airspeed.

Downbursts and Microbursts

Downbursts are strong downdrafts which induce an outburst of damaging winds on or near the surface. The size of downbursts can vary from less than one kilometer to tens of kilometers. Microburst is a term used to describe a small-scale (4 kilometers or less), short-lived downburst. Because of their small diameter and short life span, microbursts do not affect all departing and arriving traffic, even though they impact some. Those lucky aircraft arriving between downbursts will be relatively unaffected by

wind shear. However, since the possibility of encountering a microburst exists, aircrews should know the effects the resulting wind shear can have on aircraft.

Effects on Aircraft Performance

In most cases, aircraft encountering a microburst will initially experience an increase in headwind. This will increase lift and indicated airspeed. During an approach or departure, this may cause the aircraft to exceed expected performance characteristics. The pilot must refrain from reducing power or increasing pitch as this will put the aircraft in an energy deficient situation when the subsequent tailwind is encountered. A sudden loss of headwind at low altitude and low airspeed may exceed pilot and aircraft recovery capabilities, and result in tragedy such as occurred in these three airline accidents.

Wind Shear

Because of their relatively small diameter, most microbursts go undetected. Aircrews must use other indicators to avoid areas of significant low-level wind shear. Visual cues can often indicate the presence of strong surface winds and wind shear; blowing dust or smoke; precipitation trail, or virga; blowing trees; and heavy rain; all may indicate wind shear. All these phenomena have been associated with strong downdrafts and microbursts. Pilots observing these indicators should expect to encounter low-level wind shear. Pilot reports (PIREPS) are another good source. The Flight Information Handbook lists the procedures for making reports, which should include: the loss/gain of altitude and airspeed, location of shear, and type aircraft. Because thunderstorm microbursts are of short duration, PIREPS must be made and disseminated immediately. If your aircraft is weather radar equipped, the takeoff or arrival path should be examined for the presence of strong radar returns. Wind shear is often associated with these returns; however, the absence of returns does not preclude their presence.

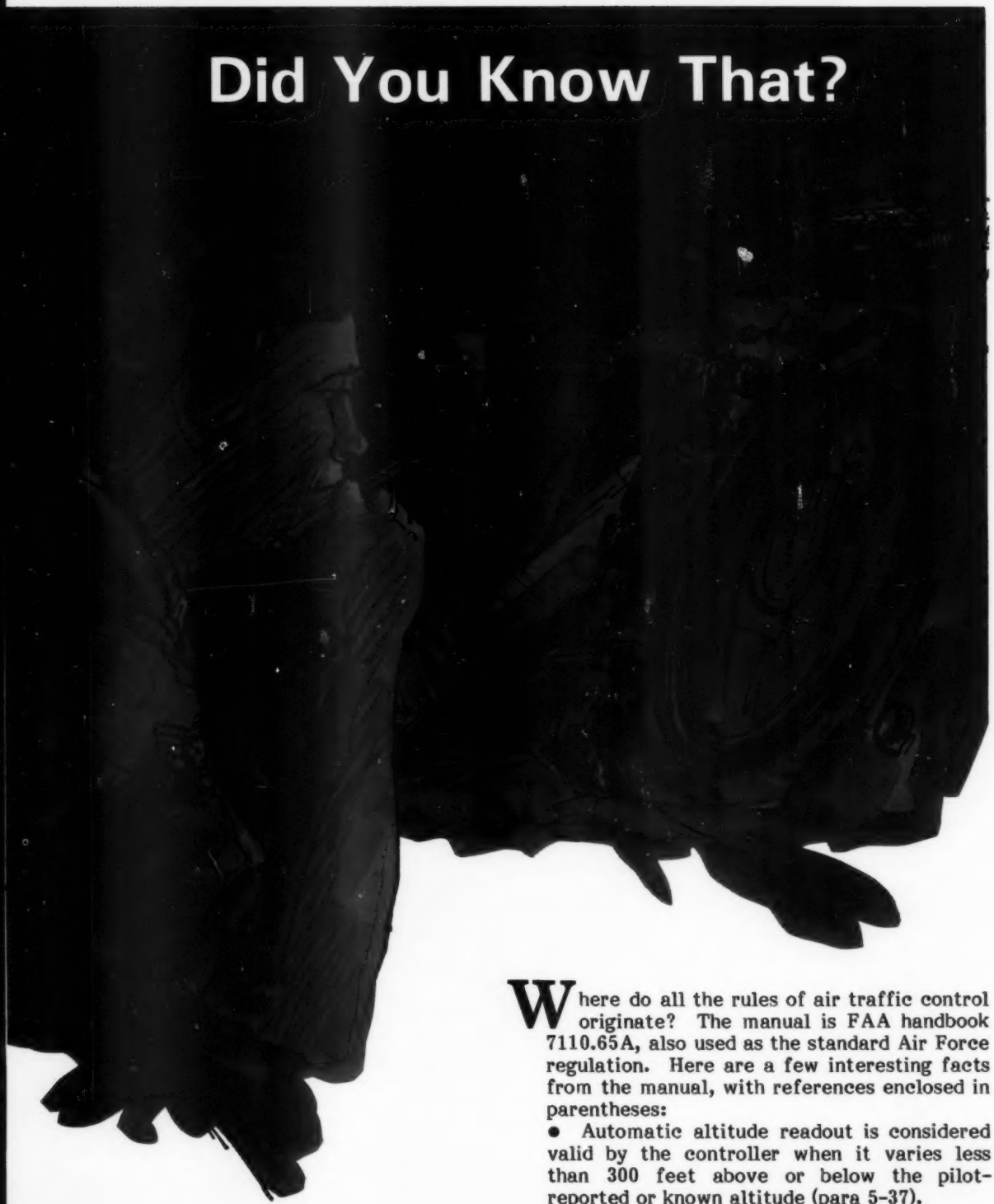
At many civilian airports with high susceptibility to wind shear, the FAA has installed Low-Level Wind Shear Alert Systems. These consist of six wind-measuring instruments strategically located around the airfield. Wind readings are continuously recorded and compared with each other. If a large change in wind speed or direction is sensed between any two instruments, the system will alert the air traffic controller in the tower. The controller will then pass a wind shear alert to departing aircraft. Aircrews receiving such an alert should exercise caution and look for other clues that indicate the presence of wind shear. **WARNING: Because of their small size, microbursts are usually not detected by this system.**

The National Center for Atmospheric Research, in Boulder, Colorado, has been doing research on a future wind shear detection system which uses a Doppler weather radar and is capable of depicting winds on a radar screen. The computer displays wind directions and speeds highlighted with varying colors to indicate whether winds are blowing towards or away from the radar station. A microburst makes an easily identifiable pattern on the screen.

Pilot Techniques

The best action is inaction—stay away from trouble by delaying takeoff or arrival until conditions are more favorable. Most Air Force missions are flexible enough to avoid the short-lived microburst phenomenon. If avoidance isn't possible, plan ahead. A shear which decreases headwind is the most dangerous. Calculate both a minimum approach speed and a minimum ground speed. Then, fly the approach or departure so that neither the IAS or GS falls below the calculated minimum speeds. The resultant higher airspeed will help counteract any downdrafts or sudden losses of headwind. If ground speed readout isn't available, it may be wise to increase the normal approach speed to provide an extra margin of safety. On crew aircraft, one crewmember should constantly monitor the flight instruments until safe landing or departure is assured. This crewmember should be aware of the TAS/IAS/GS relationships and alert the pilot when things don't look right. If an approach during wind shear conditions becomes unstable below 500 feet, execute a go-around with full power.

Did You Know That?



Where do all the rules of air traffic control originate? The manual is FAA handbook 7110.65A, also used as the standard Air Force regulation. Here are a few interesting facts from the manual, with references enclosed in parentheses:

- Automatic altitude readout is considered valid by the controller when it varies less than 300 feet above or below the pilot-reported or known altitude (para 5-37).

• A pilot can be cleared to fly in a designated quadrant from a NAVAID. Phraseology: "CLEARED TO FLY (specified) QUADRANT OF (NAVAID name and type) WITHIN (number of miles) MILE RADIUS" (para 4-30).

• Turbojet en route descents are based on a rate of descent of 4,000 to 6,000 feet per minute. Descent clearance should be issued at a point determined by adding 10 to the first two digits of the flight level (para 4-64).

• A circling approach procedure provides at least 300 feet of obstacle clearance at MDA within a defined area that varies for different aircraft approach categories (para 4-83).

• You can be cleared for a contact approach while on an IFR flight plan if: you request it, ground visibility is at least one statute mile, and approved separation is applied. A fixed altitude will not be assigned, but an "at or below" altitude which is at least 1,000 feet below any IFR traffic will be. You must be clear of clouds and have one mile flight visibility. This is an alternative procedure to an instrument approach (para 7-35).

• Clearance for VFR aircraft practicing an instrument approach *doesn't* authorize the aircraft to fly the depicted missed approach procedure. The pilot must request it, and the controller must approve it (para 4-90).

SIDE STEP MANEUVER

• The side-step maneuver is clearance to fly an approach to one runway for landing on a parallel runway (para 4-86).

• A controller can clear you to maintain VFR conditions if one of the following conditions exists: you request it, the clearance will result in noise abatement benefits, or you request a practice instrument approach and are not on an IFR flight plan (para 7-2).

• If you are vectored to final, the maximum intercept angle should be 20° *if* you are less than 2 miles from the approach gate or 30° if you are more than 2 miles from the gate (para 5-121). (The approach gate is an imaginary point one mile from the final approach fix or five miles from landing threshold, whichever is the furthest.) (Pilot/Controller Glossary.)

• You can be vectored for a visual approach if the ceiling is 500 feet above the minimum vectoring altitude, visibility is 3 miles or more, and the airport has weather reporting service. If the airport does not have weather reporting service, you can still be vectored for the approach if you report that you can make the approach VFR, and radar separation can be provided from preceding IFR aircraft (para 7-31 through 7-34).

• Ceiling and visibility information at the airport of intended landing on a radar approach will be issued if ceiling is below 1,000 feet or below the highest circling minimum, whichever is greater, or if the visibility is less than 3 miles (para 5-131).

MONITORED ILS

• The controller can give you a monitored ILS if the radar and ILS final approaches coincide and either the reported weather is below 1,500 feet or 3 miles, the approach is at night, or the pilot requests it. The controller will monitor the approach through the threshold and will initiate missed approach instructions after repeated advisories of deviation well above/below glide path or well right/left of centerline (para 5-180 and 5-182).

• A controller should ensure that a non-heavy aircraft does not start takeoff roll until at least four minutes after the preceding heavy jet has taken off (para 3-107).

• Its NAVAIDS flight inspection aircraft will not be asked to deviate from its planned action except to preclude an emergency (para 8-2).

• An aircraft is considered overdue when neither communications nor radar contact can be established with it, and 30 minutes have passed since the ETA over a compulsory or specified reporting point or clearance limit, or 30 minutes after the clearance void time (para 9-14).

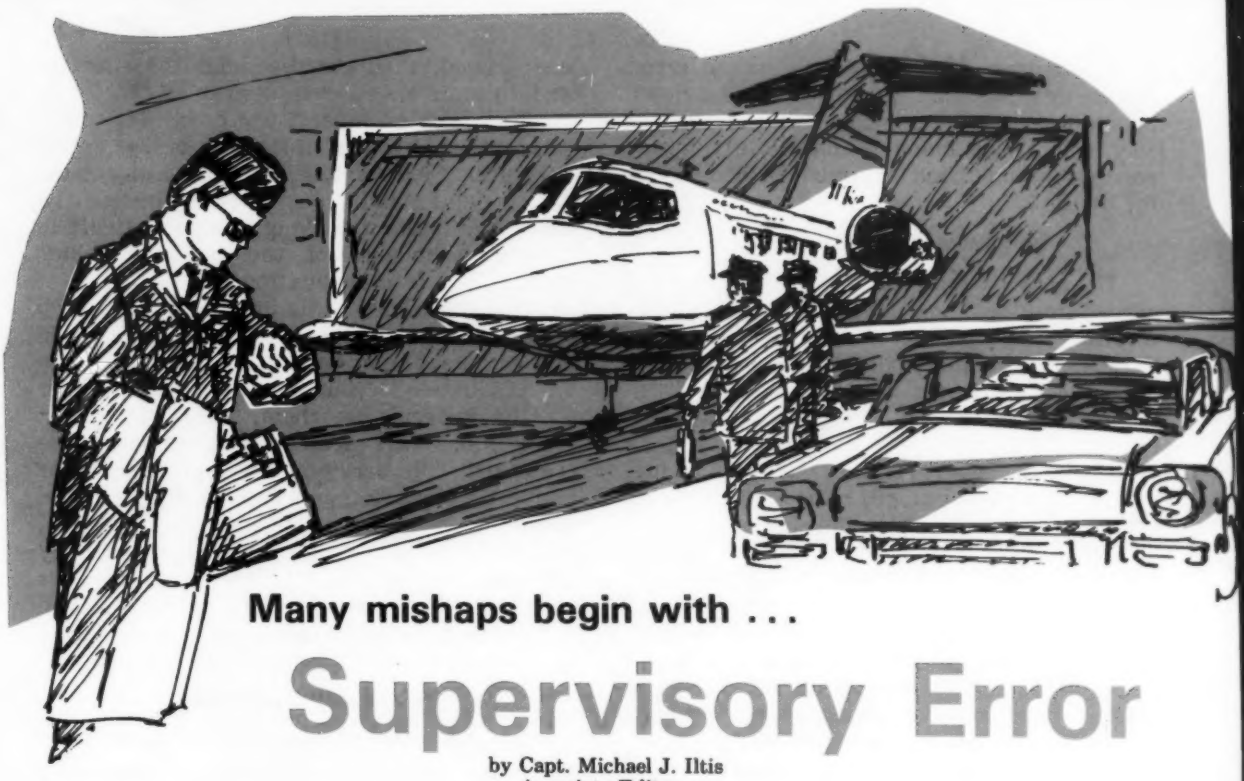
• The aircraft approach category is based on 1.3 times stall speed in the landing configuration at maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed next higher category should be used. (Pilot/Controller Glossary).

Courtesy Airscoop

Excellence in Airmanship

Left to right:
Maj. Johnnie H. Wauchop, IP
Capt. William G. Ogilvie, CP
Capt. Jill L. James, CP
TSgt. George H. Porcher, FE
A1C Bradley K. Wasson,
Dropsonde Operator.

Maj. Johnnie H. Wauchop and Crew, 54th Weather Reconnaissance Squadron, displayed superior judgment and outstanding airmanship during a night local mission on 21 Mar 86 when their WC-130 experienced a bleed air duct failure near the right wing root. Capt. William G. Ogilvie was the left seat pilot with Major Wauchop performing instructor duties in the right seat. During a go-around (while simulating 3-engine operations), they advanced the throttles and heard a loud popping noise. Meanwhile, TSgt. George H. Porcher, the flight engineer, noticed the right wheel well overheat light illuminate. Major Wauchop directed the engineer to turn off the cargo compartment air conditioner. He advanced the fourth throttle, ending the simulated emergency. The aircraft interphone and both UHF and VHF radios became inoperative. Circuit breakers began popping on the cockpit panels. Major Wauchop assumed control of the aircraft while the other pilot double-checked the radio failure. Sergeant Porcher began procedures to isolate the bleed air leak in order to avoid compounding the existing malfunction. A1C Bradley K. Wasson, dropsonde operator, experienced a blast of hot air and smelled an electrical fire near the fuselage fuel tank while walking to the flight deck. He informed the pilot and engineer. Major Wauchop immediately directed the crew to don their oxygen masks, the other pilot to set in Code 7600 (indicating radio failure) in the IFF/SIF and the engineer to start emergency procedures to eliminate smoke and fumes in the cargo compartment. The flight engineer suspected there was a fire in the area of the right wheel well. The hot bleed air, in close proximity to the liquid oxygen converter, auxiliary fuel tank, and numerous hydraulic lines, could have caused a catastrophic explosion. With electrical components damaged, there was no way of insuring the electrical switches used to shut off the bleed air had illuminated. Communication was extremely limited with the inoperative interphone. Major Wauchop directed Captain Ogilvie to change the squawk to emergency and check the tower for a green light for landing clearance. At this time, the aircraft was on a modified downwind and still configured for landing from the go-around. Major Wauchop announced they would evacuate the aircraft on the runway. They completed the before landing checks, configured the aircraft for landing, and observed the green light landing clearance. The landing and ground egress were uneventful. The bleed air melted and fused together several wire bundles. Fortunately, the liquid oxygen converter was shielded from the bleed air leak by a wing spar. The quick thinking and coordinated efforts of Major Wauchop and crew averted a potentially disastrous situation. The *TMF* staff extends its congratulations for a job well done.



Many mishaps begin with . . .

Supervisory Error

by Capt. Michael J. Iltis
Associate Editor

Aviation safety observers have written much about the hows and whys of flight mishaps. Human factors specialists make the case that mishaps caused by "pilot error" have their beginnings in the habit patterns and previous behavior of the crewmembers involved. Weather experts, on the other hand, have written volumes on the deadly effects of flying an aircraft in meteorological conditions it wasn't designed to withstand. Physiologists focus on the body's performance during flight, and aircraft technical experts and engineers are quick to publish tech data and render technical assistance when mishaps are caused by materiel failure. However, there has been precious little written concerning the role *supervision*, or lack of it, plays in mishap prevention. It is important we all understand this relationship because controlling supervisory error is the first step towards mishap prevention.

Where does supervision begin?

Flight personnel are less likely to be placed in a position most people would recognize as "supervisory" until much later in their careers than their support branch contemporaries. This is especially true of pilots and is due primarily to the orientation of the Air Force—*fly, fight, and win!* This statement identifies the basic fighting unit of the Air Force as the pilot or missile officer. Initially, both of these career fields place more emphasis on individual effort than teamwork. Consequently, for pilots, the scope of supervision begins to increase only as they upgrade to aircraft commander, instructor and flight examiner. For many, this is the first time they actually get to supervise *someone else!*

A select few of these people are given the opportunity to expand their supervisory horizons in key staff or command positions. Regardless of the level of supervision, all of us should be alert for the pitfalls of supervisory error, particularly when it involves aviation. So, let's take a look at a few of these anomalies of supervision. This article attempts not to point fingers, but rather to point out errors we're all capable of committing. We'll focus on only three of the

most common forms of supervisory error: Excessive Mission Hacking, "Old Head" Syndrome, and Lackadaisical. (By the way, I make no claim of infallibility in the conclusions but hope to give you some food for thought.)

Excessive Mission Hacking.

The aircraft took off on what was planned as a routine, low-level training flight. Weather conditions were marginal at best but the crew was highly qualified and *should* have been able to handle the mission. Fifteen minutes after takeoff, the aircraft encountered heavy rain, hail, and moderate to severe turbulence. The crew lost visual contact with the ground, entered an unusual attitude, and crashed into the side of a hill.

The safety investigation board results were not unique—the pilot intentionally flew a perfectly good aircraft into known unacceptable weather conditions and crashed. Following the mishap, onlookers made incriminating statements about the pilot (how could he have done something so stupid?) and, of course, regulations were changed to assure that even the most obvious precautions were now spelled out in black and white. Case closed—right? Not exactly.

It seems that flight in marginal weather conditions was nothing unusual for crews in this unit. Extensive training and upgrade requirements drove the flight schedule. Additionally, the nature of the unit mission alone was a motivator for most of the crewmembers. Anything that stood in the way of the mission (be it inclement weather or an overly cautious crewmember) was regarded with disdain. To say that rules were bent from time to time would be an understatement. The unit commander and operations officer were well known for their gung-ho approach toward mission accomplishment. Even though they never consciously advocated that crewmembers break rules or take unnecessary risks, their image conveyed this *perception* to unit personnel.

This fictitious unit profile offers a better glimpse of what may have prompted this aircraft commander to try and cheat death (unsuccessfully). You see, our response to most situations is based on previous experience. If flight through marginal weather conditions is allowed, or worse, encouraged, then that becomes the standard and, in some cases, even desirable.

This type of supervisory error—I'll call it "Excessive Mission Hacking"—is *the* most dangerous type because it tends to affect the entire unit and may occur innocently. Excessive mission hacking is also difficult to deal with because of the fine line which separates it from dedication.

One remedy for this condition is to keep lines of communication open and maintain proper perspective on the mission. If you're an AC, listen to your crew. If you're higher on the supervisory chain, *insist* on inputs from your staff and give something more than just "lip service" to your open door policy. Most importantly, don't criticize dissenting or minority opinions. If you do, you're liable to stop getting them, and they promote perspective. Finally, though it's tempting to rely on unit old timers for advice and counsel, don't tune out inputs from newcomers in your organization.

"Old Head" Syndrome.

Old Joe was the best airlifter around—or so he told his wife. Actually, he *had* been around for a long time and *had* developed a rather enviable reputation. In fact, he was so good the commander couldn't believe it when he was told that Joe was guilty of "ducking under" on that last approach during his most recent rotation overseas. The commander was sure that this was just a case of a disgruntled flight engineer making a big deal out of nothing. Likewise, the boss wasn't overly concerned when Joe failed his annual closed book exam. After all, Joe *was* an excellent pilot and his flight history proved it. Failing the annual closed book was not a big deal. Besides, Joe was getting close to retirement and the commander was determined not to let administrative details put a damper on an otherwise sterling career. Joe was a *sharp pilot* who was just a little bit rusty. That's why everyone was so shocked at the funeral.

You see, it seems that good old Joe just forgot to put the gear down on his last approach. Everyone wondered how Joe could have allowed this to happen, given his vast experience in the aircraft—it must have been inattention to detail. Certainly this couldn't have been predicted. The same thing could happen to any of us.

This "Old Head" Syndrome sounds a lot like "Halo Effect," doesn't it? Basically, this condition allows past knowledge of an individual to cloud present perceptions. It isn't limited to commander/subordinate relationships, but may be experienced throughout all levels of supervision. For instance, the best (and perhaps the most dangerous) example of this malady doesn't involve old timers, it happens to people relatively low in the supervisory chain—the instructor pilot.

Most instructor pilots tend to be their sharpest when flying with marginal students. Generally, they are more alert and prepared for the unusual. Not necessarily so with so-called "good students." These "good students" tend to lead IPs down the path toward complacency and the effectiveness of instructor supervision diminishes.

What to do about "Old Head" Syndrome? Recognize that this supervision anomaly is almost a fact of human nature—we trust people who have never given us a reason not to. The trick is to remain vigilant and recognize symptoms of performance breakdown before they become critical. Finally, don't allow personal relationships to stand in the way of your supervisory responsibilities.

Lackadaisical Error

Lt. Col. Lacka was proud of himself, his career, and the standard of living he'd provided for his family. His career was characterized by a relatively short tour of active flying followed by extensive time at various staff agencies. His writing, speaking, and staffing experience finally paid off with a high level staff assignment. This put him on the fast track for the job he presently held—a key unit supervisory position. However, Colonel Lacka viewed this assignment as only one more step toward his overall career goal. He felt he would succeed in this job provided three things happened: first, if the squadron crewmembers would keep from having anything greater than a class C mishap during his "watch"; next, if his folks kept aircraft reliability rate high; and finally, if he didn't let his own lack of flying proficiency and experience get him into trouble.

Colonel Lacka felt he was lucky because the unit had a good flight and ground safety track record. Consequently, he decided the best thing to do was leave well enough alone. He disguised this by establishing a unit buck-stop policy. Unfortunately, he used this policy to turn himself into a spectator within his own unit.

As far as flying was concerned, he refused to fly with anyone other than experienced instructors and flight examiners. He was extremely slow to qualify in the unit mission supposedly because his administrative duties didn't allow time for flying. This attitude toward flying led crewmembers in his unit to view him as a weak pilot, incapable of leading his troops into battle. Morale dropped rapidly. Younger crewmembers saw Colonel Lacka's promotion to his present position an indication that poor pilots could progress faster professionally than their able contemporaries. The end result of Colonel Lacka's "leadership by inaction" philosophy was an alarming increase in class C mishaps, a string of marginal grades on inspections, and finally "the big one"—a "Class A" (fortunately no fatalities).

The degree to which Lackadasical Supervisory Error impacts a unit depends upon the motivation of unit supervisors. It's easy to opt for the path of apparent least resistance. Just make sure it isn't an excuse for not getting involved with your people or side-stepping problems. Remember, you have a *leadership responsibility* to those you supervise. Finally, strive to be the best crewmember possible. There isn't a supervisor around who won't admit it's tough to meet all the demands that command or high level supervisory positions place on you *and* maintain flight proficiency, but then, you knew the job was tough when you took it. Become or remain an able crewmember and you'll surely enhance your credibility.

The last few columns have explored only three of the ways supervision can contribute to aircraft mishaps—no doubt there are many more. Supervisors at all levels should pause every now and then and evaluate their leadership styles to ensure they aren't inadvertently conveying the wrong message to crewmembers and support personnel. Are *you* (the supervisor) enhancing the flight safety program in your unit, or just giving lip service to it? Is the mission driving you or vice-versa? How does professional ambition affect your decision making process? Think about it.

Quick Stoppers

TURBINE IMBALANCE

Climbing through FL 200, our C-21 crew heard a most unpleasant, high-volume bang. Typically, this ace crew set about determining the source of said startling noise. All instrument indications were normal, oil pressure was steady at 42 PSI—no clues at all. The pilot leveled the craft at FL 370, and subsequently discovered thrust lever movement elicited excessive noise and some light vibrations above 95 percent. With all indications normal, what's a crew to do? Nothing warranted an engine shutdown, so they didn't.

A stiflingly tense hour and 50 minutes passed uneventfully, then the oil pressure on the left engine began to fluctuate. Within a minute, oil pressure dropped below 25 PSI, and the crew shut down the left engine. They declared an emergency and initiated a descent. They completed the inflight engine failure checklist crisply and uneventfully.

Postflight inspection revealed the cause of this entertaining excursion—a missing low speed turbine blade. Of course, not only was the missing blade a problem, its departure disrupted the physical continuity of some adjacent materiel.

BEATING THE SYSTEM

The pilot flew his aero club aircraft to a small airfield, the better to facilitate his leave plans. Accompanied by two non-pilot compadres, he spent the night and the next day in uneventful rest and relaxation type behavior, typical of the human animal. The next afternoon the trio took to wing for a pleasure flight. The sole pilot amongst them flew the aircraft to a nearby field, where he executed an approach and landing. The field was uncontrolled and had no landing aids. The pilot was even familiar with the airfield (he'd been there before) and made his first landing in the first 2,200 feet of the runway. He was not, however, satisfied with the landing, so he elected to take off and try again. Before he applied power for the takeoff, he disengaged and locked out the automatic gear extension system. This system prevents gear retraction until the aircraft attains 95-100 KIAS. After the takeoff, he retracted the landing gear and entered the pattern.

His normal procedure, when flying a rectangular pattern, included extending the gear before entering downwind. This habit pattern was interrupted, possibly by his self-initiated concentration on accomplishing a "good" landing. He normally extended 10° flaps abeam the touchdown point, and this he did. He followed with his usual practice of extending 25° of flaps turning base, when he also called his turn on unicom frequency. The turn to final was into the sun. On short final he put the flaps further down, to the 40° position for landing. The approach seemed normal until just before touchdown, when he heard what he thought was the stall warning horn followed by ominous scraping sounds. The pilot didn't apply power for a go-around, and managed to keep the aircraft on the runway. After the aircraft came to a complete stop everyone exited uninjured. The result? Another gear-up landing—brought to you by interrupted habit patterns, nonstandard techniques, and crew preferential attention.

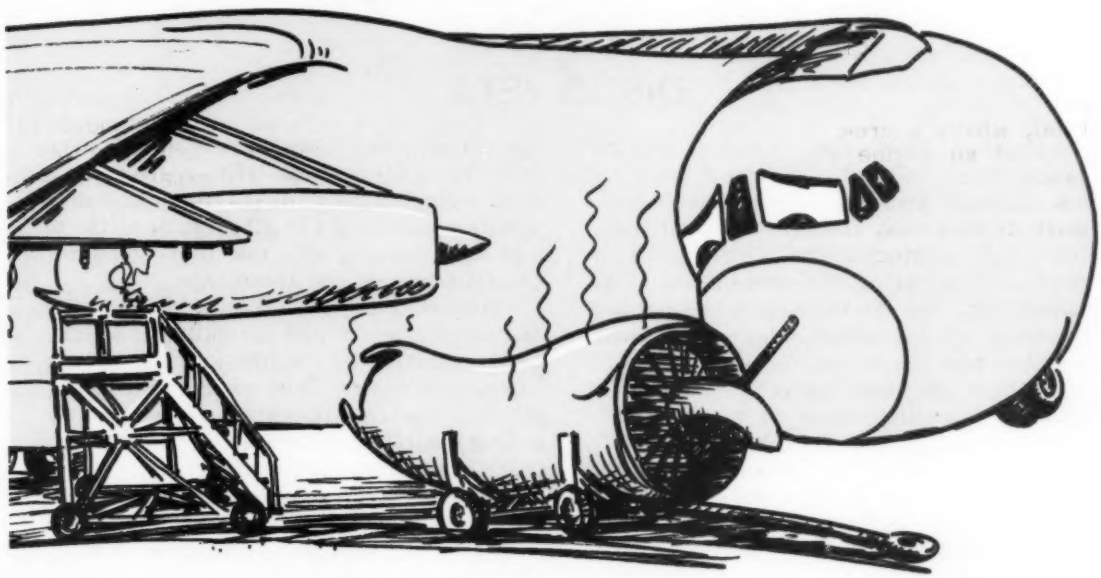
HOW DO YOU SPELL RELIEF?

N-O-F-O-D

On their first leg of this simulated hostile mission, the C-130 crew popped in and picked up six folks who would later leave the aircraft without waiting for a landing. They flew said jumpers to the DZ for a successful airdrop, then returned to the pick-up point to offload some equipment. After that it was off to the RON location, where the crew undoubtedly engaged in intense post flight mission analysis and preflight planning.

During ground operations, the aircraft was appropriately parked on the C-130 ramp. The taxiways were paved, but narrow. Consequently, during taxi the outboard engines were suspended over the ground, a desert soil of sand and rocks ranging in size from small pebbles to large stones. The crew kept the outboard engines operating in low-speed ground idle. During preflight inspection the following day, the crew chief discovered apparent FOD to the Number 4 engine's compressor section.

The maintenance folks hadn't done any repair work on the engine, nor performed any engine runs. In addition, the crew hadn't noticed any abnormal indications on the engine's instruments the previous day. Maintenance personnel changed the engine and took a close look at it back at home station. The first three stages of the compressor sustained moderate damage, and the entire compressor section incurred minor damage. No engine or nacelle parts were missing, and the investigation revealed the ingested article was of considerable hardness. This leads to the conclusion the object was probably metal, not a stone or piece of concrete. These things are never simple, but at $9,330.00 dollars a whack, they're expensive.



DISCO JETS

Another fine cross country sojourn almost over, and this C-21 crew made an idle descent from FL 390 to 10,000 feet. Once at this new, bigger-houses altitude, the pilot advanced the throttles from flight idle to about 67 percent N1. As advertised, the twin engines responded normally to the input, increasing their pitch, but all was not smooth. Approximately one second later, the Number 1 engine began to assert itself, beginning by rolling back to 64 percent. Then, just to keep the crew off balance, the engine rolled forward to 74 percent. Not satisfied with merely getting the crews' attention, the frisky engine's RPM began dancing between 65 and 72 percent. The crew turned the engine synchronizer system off, but the dance went on, now from 62 to 70 percent. The crew made a final effort to terminate the gamboling excursion, placing the affected throttle to idle and turning off the fuel computer (everybody's got one these days).

Forced into the manual mode, the engine now performed normally, under the newly motivated vigilant eyes of a bewildered crew. They executed a tense, but uneventful, landing at a nearby military airfield. Despite a painstaking, thorough examination, no answers to the engines' autoperformance surfaced. The crew flew the aircraft for seven hours the following day (Hey, no pressure, right?) without recurrence. Disco fever strikes again.

After Deadlines

***TMF* ART DIRECTOR WINS FIRST PLACE**—Tommy O'Laughlin, *TMF*'s own, won First Place in the Second Quarter, 1986, AAVS Worldwide Illustration competition. Mr. O'Laughlin's entry, a painting of the Statue of Liberty, graced the cover of our July 1986 issue. One more recognition to be added to a long list of kudos received by Mr. O'Laughlin in his career. Congratulations!

MAC C-141 STARLIFTERS HELP DROUGHT-STRICKEN FARMERS—MAC C-141s from Charleston AFB, McGuire AFB, and Travis, Norton, and McChord AFBs, delivered hay to drought victims in the southeastern United States. President Reagan ordered the airlift for the farmer's relief organized by Governor James Thompson of Illinois and Governor Richard Riley of South Carolina. Two C-141s delivered about 1,600 bales from Illinois on the initial mission with a total of 16 flights scheduled. Missions also transported Iowa and Missouri hay.

FIRST C-141B TRANSFER TO AN AIR NATIONAL GUARD UNIT—General Duane H. Cassidy, Commander in Chief, Military Airlift Command, presented a symbolic "ignition key" to Mississippi Governor Bill Allain during the July 12 transfer of the first C-141B to an Air National Guard Unit. He made the presentation during ceremonies conducted by the Mississippi Air National Guard and the 172d Military Airlift Group at Charles L. Sullivan ANGB, near Jackson, Mississippi. Eight Starlifters are going to the unit, which has operated C-130 aircraft since 1971.

AIRLINE AEROMEDICAL FLEET APPROVED—The U.S. Air Force has approved a plan to use 115 commercial aircraft as air ambulances in time of war. The 85 Boeing 767s and 30 Douglas MD-80s will become part of the Civil Reserve Air Fleet, in which airlines augment military transport aircraft in war. Airline pilots will fly the aircraft and airline officials will manage the day-to-day operations; while military flight nurses and medical technicians will fly as crewmembers. The Boeing 767s will replace C-141 Starlifters as strategic aeromedical evacuation aircraft and the MD-80s will replace the C-9A Nightingales for redistributing casualties domestically. The C-9As will be deployed to help the C-130 Hercules evacuate casualties within the theater of operations. Test flights will start in 1989 with full capability scheduled in 1991.

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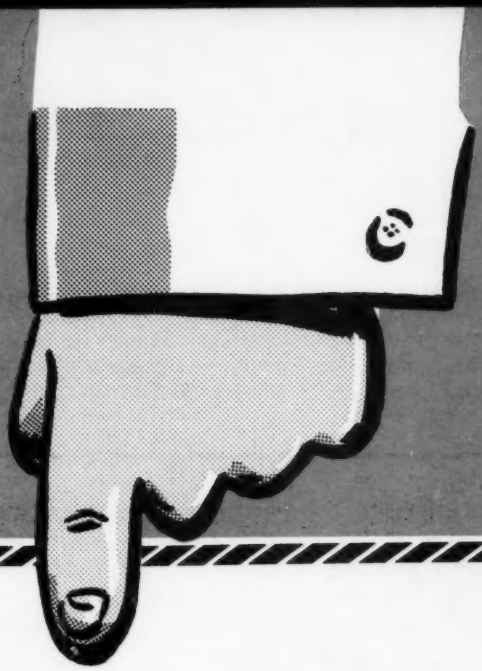

ASSOCIATE EDITORS NEEDED!

The world's best flight safety magazine—*TMF* of course—needs YOU!. Reporting dates in April and July 1987. We're looking for rated captains or junior majors, preferably with a safety, journalism or public relations background. If interested (no IFs, you should be!) write to: Supervising Editor, The MAC Flyer, HQ MAC/IGFE, Scott AFB, Illinois 62225-5101; or call AUTOVON 576, - 3534/5542.